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APPLICATION FOR LETTERS PATENT

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CURVED STRUCTURAL MEMBER

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CURVED STRUCTURAL MEMBER

TECHNICAL FIELD

[0001] The present invention relates to a structural member for use in construction, and more specifically to a curved metal structural member which is useful in making various architectural features.

BACKGROUND OF THE INVENTION

[0002] In the construction of various styles of buildings such as light commercial, and other types of construction, architects, as well as municipal building codes sometime require the use of metal framing studs for portions of the construction. These metal framing studs are well known, and are formed into a generally channel-shaped member which may have, at various locations, apertures formed therethrough which allows for the passage of pipes, or other electrical conduits therethrough. These metal framing studs are typically formed into predetermined lengths, and are thereafter cut to length and fastened one, to the other, by means of various fasteners such as screws, rivets or the like.

[0003] While these prior art metal structural members or studs have been utilized with a great deal of success, they have limited utilization in a number of different environments. For example, in view of the fact that the strength of such members is a result of the channel like structure, the use of such metal studs is often limited when it is employed in some angulated orientations, or when a portion of one or both the sidewalls of the metal stud are removed.

[0004] In addition to the foregoing limitations, prior art metal studs have not been useful, as a general matter, in forming curved surfaces which might find usefulness in forming arched doorways, curved walls, domed ceilings or the like.

[0005] A curved structural member which addresses the shortcomings attendant with the prior art is the subject matter of the present application.

SUMMARY OF THE INVENTION

[0006] One aspect of the present invention relates to a structural member which includes a first portion which is defined by a first peripheral edge; and a plurality of tabs are made integral with the first portion, and which are disposed in spaced relation along the first peripheral edge, and wherein the respective tabs are oriented in angulated relation relative to the first portion.

[0007] Another aspect of the present invention relates to a structural member and which includes a first portion and which is defined by a first curved peripheral edge; and a second portion having a peripheral edge, and wherein a plurality of tabs are disposed in angularly spaced relation along the peripheral edge of the second portion, and wherein at least one of the tabs is fastened to the first portion, and wherein the plurality of tabs permit the second portion to be positioned, at least in part, along the first curved peripheral edge and deformed into a shape having a curvature which is substantially similar to the curved first peripheral edge of the first portion.

[0008] Yet a further aspect of the present invention relates to a structural member which includes first, second and third portions which are joined together, and which define a channel, and wherein at least one of the first, second or third portions have a peripheral edge, and wherein a plurality of tabs are made integral with the peripheral

edge, and are disposed in spaced relation along the peripheral edge, and wherein at least one of the plurality of tabs is affixed to an adjacent portion.

[0009] Still another aspect of the present invention relates to a structural member having a curved shape and which includes a first, centrally disposed web portion, and which has opposite, first and second peripheral edges, and wherein the first centrally disposed web portion has a longitudinal axis, and is deformable substantially along the longitudinal axis into a curved shape; a plurality of tabs made integral with the each of the first and second peripheral edges of the first web portion, and wherein the plurality of tabs are disposed in spaced relation along each of the first and second peripheral edges and extend angularly outwardly relative to the first, centrally disposed web portion, and wherein the respective tabs permit the first, centrally disposed web portion to be deformed substantially along the longitudinal axis into the curved shape; a second portion having a curved shape which is substantially similar to the curved shape of the first, centrally disposed web, and wherein at least some of tabs disposed along the first peripheral edge are affixed to the second portion, and wherein the plurality of tabs positions the second portion in angulated spaced relation relative to the first centrally disposed web; and a third portion having a curved shape which is substantially similar to the curved shape of the first, centrally disposed web portion, and wherein at least some of tabs disposed along the second peripheral edge are affixed to the third portion, and wherein the plurality of tabs positions the third portion in angulated spaced relation relative to the first centrally disposed web portion.

[0010] Moreover, another aspect of the present invention relates to a structural member having a curved shape and which includes a first, centrally disposed web portion, and which has opposite first and second peripheral edges and which has a

curved shape; a second and a third portion each having opposite first and second peripheral edges, and a longitudinal axis, and wherein each of the second and third portions are deformable substantially along their respective longitudinal axes into a curved shape which is substantially similar to the curved shape of the first centrally disposed web portion; and a plurality of tabs made integral with each of the first peripheral edges of the respective second and third portions, and wherein the respective tabs are disposed in spaced relation along each of the first peripheral edges of the second and third portions and extend angularly outwardly relative thereto, and wherein at least some of the tabs disposed along the first peripheral edge of the second portion are affixed to the first centrally disposed web, and which positions the second portion in angulated juxtaposed relation relative to the first peripheral edge of the first, centrally disposed web portion, and wherein at least some of the tabs disposed along the first peripheral edge of the third portion are affixed to the first centrally disposed web, and which positions the second portion in angulated juxtaposed relation relative to the second peripheral edge of the first, centrally disposed web portion.

[0011] These and other aspects of the present invention will be discussed in further detail hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 is a perspective, side elevation view of a first form of the structural member of the present invention.

[0013] Fig. 2 is a bottom plan view of the first form of the structural member shown in Fig. 1 with some underlying surfaces shown in phantom lines.

[0014] Fig. 3 is a top plan view of the first form of the structural member shown in Fig. 1 with some underlying surfaces shown in phantom lines.

[0015] Fig. 4 is a transverse, vertical sectional view of one possible cross sectional profile of the first form of the present invention and which is taken along line 4-4 of Fig. 3.

[0016] Fig. 5 is a second, possible, transverse, vertical sectional view of the first form of the present invention.

[0017] Fig. 6 is a third, possible, transverse, vertical sectional view of the first form of the present invention.

[0018] Fig. 7 is a fourth, possible, transverse, vertical sectional view of the first form of the present invention.

[0019] Fig. 8 is a perspective, side elevation view of a second form of the structural member of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] This disclosure of the invention is submitted in furtherance of the constitutional purposes of the U.S. Patent Laws "to promote the progress of science and useful arts" (Article 1, Section 8).

[0021] A first form of a structural member 10 of the present invention is shown in Figs. 1-7. The first form of the structural member 10 includes a first centrally disposed web portion 11, having a main body 12, and which has opposite first and second peripheral edges 13 and 14, respectively. Still further, the main body 12 has an inside facing surface 15, and an outside facing surface 16. The inside and outside facing

surfaces are substantially planar and the main body 12 is formed into a curved shape having a predetermined curvature.

[0022] The first form of the present invention 10 further includes a second portion which is generally indicated by the numeral 20, and which includes opposite first and second peripheral edges 21 and 22, respectively. The second portion further has an outside facing surface 23 and an inside facing surface 24. The second portion 20 is defined by a longitudinal axis which is generally indicated by the line labeled 25. The second portion 20 is deformable substantially along the longitudinal axis 25 into a curved shape which is substantially similar to the curved shape of the first peripheral edge 13 of the first, centrally disposed web portion 11. As seen in Fig. 1, and following, a third portion 30 is provided, and it similarly has first and second peripheral edges 31 and 32, an outside facing surface 33 and an inside facing surface 24. The third portion 30, like the second portion 20, has a longitudinal axis which is generally indicated by the line labeled 35. The third portion 30 is similarly deformable substantially along the longitudinal axis 35 into a curved shape which is substantially similar to the curved shape of the second peripheral edge 14 of the first, centrally disposed web portion 11.

[0023] As seen in Fig. 1 and following, a plurality of tabs, which are generally indicated by the numeral 40, are made integral with each of the first peripheral edges 21 and 31 of the respective second and third portions 20 and 30, respectively. The respective tabs as seen in Fig. 1, and following, are disposed in spaced relation along each of the first peripheral edges 21 and 31 and extend angularly outwardly relative thereto. As seen in Fig. 4 for example, the tabs may extend in a substantially perpendicular orientation relative to the respective portions, or further may extend in various angular orientations relative thereto as seen in Figs. 5, 6 and 7, respectively.

Still further, it will be seen that the tabs may be substantially equally spaced along the first and second peripheral edges 21 and 31, or further may be spaced at irregular intervals based upon the curvature of the first form of the invention 10. As will be seen in the drawings, a space 41 defined between the plurality of tabs 40 and which permits the second and third portions 20 and 30 to be deformed substantially along their respective longitudinal axis 25 and 35 in order to conform the curvature of the respective second and third portions to the curvature of the first and second peripheral edges 13 and 14 of the first centrally disposed web portion 11. As seen in Fig. 1 and following, at least one of the tabs 40 is fastened or otherwise affixed by a rivet screw of the like 42 to the first centrally disposed web 11, such that the second and third portions are disposed in juxtaposed angulated and spaced relation relative to the first and second peripheral edges 13 and 14 of the centrally disposed web portion 11, to form the first form of the invention 10.

[0024] Referring now to Fig. 8, the second form of the present invention is generally indicated by the numeral 50. The second form of the invention 50 includes a first, centrally disposed web portion which is generally indicated by the numeral 51. The web portion further has a main body 52, and which is defined by a longitudinal axis which is generally indicated by the numeral 53. The first centrally disposed web portion 51 is formed from a deformable substrate which permits the centrally disposed web portion 51 to be deformed substantially along the longitudinal axis 53 into a curved shape having a desired curvature as seen in Fig. 8. The first centrally disposed web portion 51 further includes a first peripheral edge 54, and an opposite, second peripheral edge 55. Still further, the first centrally disposed web portion 51 has an inside facing surface 56, and an opposite outside facing surface 57. As seen in Fig. 8,

the second form of the structural member 50 further has a second and third portion 60 and 70, respectively. Each of these portions have opposite first and second peripheral edges 61, and 62, and 71 and 72, respectively. Still further, the respective second and third portions 60 and 70 each have an outside facing surface 63 and 73; and inside facing surfaces 64 and 74, respectively. As illustrated in Fig. 8, each of the second and third portions 60 and 70 have a curved shape which is substantially similar to the curved shape of the first centrally disposed web portion 51.

[0025] A plurality of tabs 80 are made integral with each of the first and second peripheral edges 54 and 55 of the first centrally disposed web portion 51. The plurality of tabs 80 are disposed in spaced relation along each of the first an second peripheral edges, and extend angularly outwardly relative to the first centrally disposed web portion 51. The respective tabs 80 allow the second and third portions 60 and 70 to be disposed in angulated, spaced relation relative to the first centrally disposed web portion 51. At least one of the tabs 80 is fastened to the respective second and third portions by means of a screw, rivet or the like 81, thereby orienting the second and third portions in juxtaposed angulated relation relative to the first centrally disposed web portion 51. A plurality of spaces 82 are defined between the respective tabs, and which permits the first web portion 51 to be formed into the curved shape.

[0026] With respect to the first and second forms of the invention 10 and 50 respectively, it should be understood that while the peripheral edges of the respective portions 11, 20, 30, 51, 60 and 70 are illustrated herein as having peripheral edges which are substantially parallel, it is not necessary that these edges be in this relationship in order for the invention to function in an appropriate manner. Still further, and as earlier discussed, while the respective plurality of tabs 40 and 80 as discussed

with respect to the first and second forms of the invention 10 and 50 are shown as being of substantially equal dimensions and are disposed in equally spaced relation one relative to the other, other sizes and spacings for the respective tabs may be selected based upon the desired curvature (including complex curves) for the first and second forms of the invention 10 and 50, respectively. As seen in the drawings, each form of the invention defines a curved channel 90. For purposes of the present application and the appended claims, a substantially similar curvature will be defined as one wherein the curvature as measured in feet/radii is within less that about 30%.

OPERATION

[0027] The operation of the described embodiment of the present invention is believed to be readily apparent and is briefly summarized at this point.

[0028] In its broadest aspect the present invention relates to a structural member 50 which is defined by a first peripheral edge 54, and wherein a plurality of tabs 80 are disposed in spaced relation along the first peripheral edge. The respective tabs 80 are oriented in angulated relation relative to the first portion.

[0029] More specifically, the present invention includes a structural member 10 which includes a first portion 11 which is defined by a first curved peripheral edge 13. The structural member 10 further includes a second portion 20 having a peripheral edge 21, and wherein a plurality of tabs 40 are disposed in angularly spaced relation along the peripheral edge 21 of the second portion 20. At least one of the tabs 40 is fastened to the first portion 11, and wherein the plurality of tabs 40 permit the second portion 20 to be positioned, at least in part, along the first curved peripheral edge 13 and deformed

into a shape having a curvature which is substantially similar to the curved first peripheral edge 13 of the first portion 11.

[0030] In addition to the foregoing, the present invention relates to structural members having a first form 10 and a second form 50. In the first form of the invention as seen in Fig. 1, the structural member 10 includes a first, centrally disposed web portion 11, and which has opposite, first and second peripheral edges 13 and 14, and which further has a curved shape. A second and third portion 20 and 30 are provided, each having opposite first and second peripheral edges 21, 22, 31 and 32, respectively and respective longitudinal axes 25 and 35. Each of the second and third portions 20 and 30 are deformable substantially along their respective longitudinal axes 25 and 35 into a curved shape which is substantially similar to the curved shape of the first centrally disposed web portion 11. A plurality of tabs 40 are made integral with the each of the first peripheral edges 21 and 31. The respective tabs 40 are disposed in spaced relation along each of the first peripheral edges and extend angularly outwardly relative thereto. Some of the respective tabs of the individual portions are affixed to the first, centrally disposed web portion. These tabs 40 facilitate the positioning of the second and third portions 20 and 30, in angulated juxtaposed relation relative to the respective peripheral edges 13 and 14 to form the structural member 10.

[0031] In the second form of the invention which is generally indicated by the numeral 50, and which is seen in Fig. 8, a first, centrally disposed web portion 51 is provided, and which has opposite, first and second peripheral edges 54 and 55. Still further, the first centrally disposed web portion has a longitudinal axis that is indicated by the numeral 53. The first centrally disposed web portion is deformed substantially along the longitudinal axis into a curved shape. A plurality of tabs 80 are made integral

with each of the first and second peripheral edges of the first web portion. The plurality of tabs 80 are disposed in spaced relation along each of the first and second peripheral edges 54 and 55, and extend angularly outwardly relative to the first, centrally disposed web portion. The respective tabs permit the first, centrally disposed web portion to be deformed substantially along the longitudinal axis into the curved shape. Second and third portions 60 and 70 are provided. Each of the second and third portions have a curved shape which is substantially similar to the curved shape of the first, centrally disposed web portion. At least some of tabs 80 positioned along the first and second peripheral edges 54 and 55 are affixed to the second and third portion, thereby positioning the second and third portions in angulated spaced relation relative to the first centrally disposed web portion.

[0032] Therefore it will be seen that the present structural member 10 and 50 provides many advantages over the prior art metal studs utilized heretofore and permits a builder to fabricate various curved surfaces in a fashion not possible heretofore. Still further, in view of the nature of the invention, a wide variety of curvatures (including complex curves) can be readily fabricated thereby allowing structural members of various shapes to be formed for a wide variety of novel structures.

[0033] In compliance with the statute, the invention has been described in language more or less specific as to structural and methodical features. It is to be understood, however, that the invention is not limited to the specific features shown and described, since the means herein disclosed comprise preferred forms of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the proper scope of the appended claims appropriately interpreted in accordance with the doctrine of equivalents.